REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources,

AGENCY USE ONLY (Leave blank) 2. Ke. On.	nts regarding mation Operations and Reports, 1215 Jefferson orate for Information Operations and Reports, 1215 Jefferson tion Project (0704-0188), Washington, DC 20503. E. AND DATES COVERED
12/08/76	
TILLE AND SUBTITLE DECONTAMINATION CRITERIA, DIMP AND DCPD (U)	5. FUNDING NUMBERS
DETERMINATION OF DECONTAMINATION CRITERIA, DATE AND DOTO (C)	
. AUTHOR(S)	DAMD 17 75 C 5069
O'DONOVAN, P.	
. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)	8. PERFORMING ORGANIZATION
	REPORT NUMBER
AEROJET ORDNANCE & MANUFACTURING COMPANY DOWNEY, CA	ŀ
	81320R16
. SPONSORING / MONITORING AGENCY NAME(S) AND ADDR (SS)	10. SPONSORING/MONITORING AGENCY REPORT NUMBER
- SPONSONING / MICH.	Address Mar Com Indiana
FORT DETRICK (FREDERICK, MD.)	
FORT DETRICK (FREDERICK, MD.) FREDERICK, MD JAN 19 1995	
1. SUPPLEMENTARY NOTES	
1. SUFFERINGENESS OF THE STATE	•
Company of the contract of the	
2a. DISTRIBUTION / AVAILABILITY STATEMENT	12b. DISTRIBUTION CODE
2a. DISTRIBUTION / AVAILABLETT S	
APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED	l
APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED	
APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED	
3 ABSTRACT (Maximum 200 words) THIS IS A PROGRESS REPORT ON AEROJET'S STUDIES OF EXPE	RIMENTS DES OF
TABSTRACT (Maximum 200 words) THIS IS A PROGRESS REPORT ON AEROJET'S STUDIES OF EXPECURRENTLY UNDERWAY (E.G. PLANT GROWTH & DIMP IN TWO MOTAPPLICATION TO SOIL ARE CONTINUING. EVAPORATION SEEME	RIMENTS DES OF D TO BE A
TABSTRACT (Maximum 200 words) THIS IS A PROGRESS REPORT ON AEROJET'S STUDIES OF EXPERIENTLY UNDERWAY (E.G. PLANT GROWTH & DIMP IN TWO MOST APPLICATION TO SOIL ARE CONTINUING. EVAPORATION SEEMES SIGNIFICANT FACTOR IN THE LOSS OF DCPD FROM SOIL SAMPLE	RIMENTS DES OF D TO BE A ES. TO
THIS IS A PROGRESS REPORT ON AEROJET'S STUDIES OF EXPECURRENTLY UNDERWAY (E.G. PLANT GROWTH & DIMP IN TWO MOSAPPLICATION TO SOIL ARE CONTINUING. EVAPORATION SEEMESIGNIFICANT FACTOR IN THE LOSS OF DCPD FROM SOIL SAMPLED DETERMINE THAT THIS IS TRUE EVAPORATION, SEVERAL SIMPLED PERFORMED. THE STATISTICAL TREATMENT OF THE PLANT YIE	RIMENTS DES OF D TO BE A ES. TO E EXPERIMENTS WERE LDS FROM THE 1, 8 AND 20
THIS IS A PROGRESS REPORT ON AEROJET'S STUDIES OF EXPECURRENTLY UNDERWAY (E.G. PLANT GROWTH & DIMP IN TWO MOST APPLICATION TO SOIL ARE CONTINUING. EVAPORATION SEEMES SIGNIFICANT FACTOR IN THE LOSS OF DCPD FROM SOIL SAMPLED DETERMINE THAT THIS IS TRUE EVAPORATION, SEVERAL SIMPLE	RIMENTS DES OF D TO BE A ES. TO E EXPERIMENTS WERE LDS FROM THE 1, 8 AND 20
TABSTRACT (Maximum 200 words) THIS IS A PROGRESS REPORT ON AEROJET'S STUDIES OF EXPECURRENTLY UNDERWAY (E.G. PLANT GROWTH & DIMP IN TWO MOSAPPLICATION TO SOIL ARE CONTINUING. EVAPORATION SEEMESIGNIFICANT FACTOR IN THE LOSS OF DCPD FROM SOIL SAMPLED DETERMINE THAT THIS IS TRUE EVAPORATION, SEVERAL SIMPLED PERFORMED. THE STATISTICAL TREATMENT OF THE PLANT YIE	RIMENTS DES OF D TO BE A ES. TO E EXPERIMENTS WERE LDS FROM THE 1, 8 AND 20
THIS IS A PROGRESS REPORT ON AEROJET'S STUDIES OF EXPECURRENTLY UNDERWAY (E.G. PLANT GROWTH & DIMP IN TWO MOSAPPLICATION TO SOIL ARE CONTINUING. EVAPORATION SEEMESIGNIFICANT FACTOR IN THE LOSS OF DCPD FROM SOIL SAMPLED DETERMINE THAT THIS IS TRUE EVAPORATION, SEVERAL SIMPLED PERFORMED. THE STATISTICAL TREATMENT OF THE PLANT YIE	RIMENTS DES OF D TO BE A ES. TO E EXPERIMENTS WERE LDS FROM THE 1, 8 AND 20
TARSTRACT (Maximum 200 words) THIS IS A PROGRESS REPORT ON AEROJET'S STUDIES OF EXPECURRENTLY UNDERWAY (E.G. PLANT GROWTH & DIMP IN TWO MOSAPPLICATION TO SOIL ARE CONTINUING. EVAPORATION SEEMESIGNIFICANT FACTOR IN THE LOSS OF DCPD FROM SOIL SAMPLED DETERMINE THAT THIS IS TRUE EVAPORATION, SEVERAL SIMPLE PERFORMED. THE STATISTICAL TREATMENT OF THE PLANT YIE PPM DIMP GROWTH TESTS AWAITS COMPLETION OF THE SUGAR BE	RIMENTS DES OF D TO BE A ES. TO E EXPERIMENTS WERE LDS FROM THE 1, 8 AND 20 EET & CARROT HARVEST.
THIS IS A PROGRESS REPORT ON AEROJET'S STUDIES OF EXPECURRENTLY UNDERWAY (E.G. PLANT GROWTH & DIMP IN TWO MOSAPPLICATION TO SOIL ARE CONTINUING. EVAPORATION SEEMESIGNIFICANT FACTOR IN THE LOSS OF DCPD FROM SOIL SAMPLED DETERMINE THAT THIS IS TRUE EVAPORATION, SEVERAL SIMPLED PERFORMED. THE STATISTICAL TREATMENT OF THE PLANT YIE	RIMENTS DES OF D TO BE A ES. TO E EXPERIMENTS WERE LDS FROM THE 1, 8 AND 20 EET & CARROT HARVEST.
TARSTRACT (Maximum 200 words) THIS IS A PROGRESS REPORT ON AEROJET'S STUDIES OF EXPECURRENTLY UNDERWAY (E.G. PLANT GROWTH & DIMP IN TWO MOSAPPLICATION TO SOIL ARE CONTINUING. EVAPORATION SEEMESIGNIFICANT FACTOR IN THE LOSS OF DCPD FROM SOIL SAMPLED DETERMINE THAT THIS IS TRUE EVAPORATION, SEVERAL SIMPLE PERFORMED. THE STATISTICAL TREATMENT OF THE PLANT YIE PPM DIMP GROWTH TESTS AWAITS COMPLETION OF THE SUGAR BE	RIMENTS DES OF D TO BE A ES. TO E EXPERIMENTS WERE LDS FROM THE 1, 8 AND 20 EET & CARROT HARVEST.
TARSTRACT (Maximum 200 words) THIS IS A PROGRESS REPORT ON AEROJET'S STUDIES OF EXPECURRENTLY UNDERWAY (E.G. PLANT GROWTH & DIMP IN TWO MOSAPPLICATION TO SOIL ARE CONTINUING. EVAPORATION SEEMESIGNIFICANT FACTOR IN THE LOSS OF DCPD FROM SOIL SAMPLED DETERMINE THAT THIS IS TRUE EVAPORATION, SEVERAL SIMPLE PERFORMED. THE STATISTICAL TREATMENT OF THE PLANT YIE PPM DIMP GROWTH TESTS AWAITS COMPLETION OF THE SUGAR BE	RIMENTS DES OF D TO BE A ES. TO E EXPERIMENTS WERE LDS FROM THE 1, 8 AND 20 EET & CARROT HARVEST.
TARSTRACT (Maximum 200 words) THIS IS A PROGRESS REPORT ON AEROJET'S STUDIES OF EXPECURRENTLY UNDERWAY (E.G. PLANT GROWTH & DIMP IN TWO MOSAPPLICATION TO SOIL ARE CONTINUING. EVAPORATION SEEMESIGNIFICANT FACTOR IN THE LOSS OF DCPD FROM SOIL SAMPLED DETERMINE THAT THIS IS TRUE EVAPORATION, SEVERAL SIMPLE PERFORMED. THE STATISTICAL TREATMENT OF THE PLANT YIE PPM DIMP GROWTH TESTS AWAITS COMPLETION OF THE SUGAR BE	RIMENTS DES OF D TO BE A ES. TO E EXPERIMENTS WERE LDS FROM THE 1, 8 AND 20 EET & CARROT HARVEST.
TARSTRACT (Maximum 200 words) THIS IS A PROGRESS REPORT ON AEROJET'S STUDIES OF EXPECURRENTLY UNDERWAY (E.G. PLANT GROWTH & DIMP IN TWO MOSAPPLICATION TO SOIL ARE CONTINUING. EVAPORATION SEEMESIGNIFICANT FACTOR IN THE LOSS OF DCPD FROM SOIL SAMPLED DETERMINE THAT THIS IS TRUE EVAPORATION, SEVERAL SIMPLE PERFORMED. THE STATISTICAL TREATMENT OF THE PLANT YIE PPM DIMP GROWTH TESTS AWAITS COMPLETION OF THE SUGAR BE	RIMENTS DES OF D TO BE A ES. TO E EXPERIMENTS WERE LDS FROM THE 1, 8 AND 20 EET & CARROT HARVEST.
TARSTRACT (Maximum 200 words) THIS IS A PROGRESS REPORT ON AEROJET'S STUDIES OF EXPECURRENTLY UNDERWAY (E.G. PLANT GROWTH & DIMP IN TWO MOSAPPLICATION TO SOIL ARE CONTINUING. EVAPORATION SEEMESIGNIFICANT FACTOR IN THE LOSS OF DCPD FROM SOIL SAMPLED DETERMINE THAT THIS IS TRUE EVAPORATION, SEVERAL SIMPLE PERFORMED. THE STATISTICAL TREATMENT OF THE PLANT YIE PPM DIMP GROWTH TESTS AWAITS COMPLETION OF THE SUGAR BE	RIMENTS DES OF D TO BE A ES. TO E EXPERIMENTS WERE LDS FROM THE 1, 8 AND 20
THIS IS A PROGRESS REPORT ON AEROJET'S STUDIES OF EXPERIENTLY UNDERWAY (E.G. PLANT GROWTH & DIMP IN TWO MOST APPLICATION TO SOIL ARE CONTINUING. EVAPORATION SEEMES SIGNIFICANT FACTOR IN THE LOSS OF DCPD FROM SOIL SAMPLE DETERMINE THAT THIS IS TRUE EVAPORATION, SEVERAL SIMPLE PERFORMED. THE STATISTICAL TREATMENT OF THE PLANT YIE PPM DIMP GROWTH TESTS AWAITS COMPLETION OF THE SUGAR BETTER THE PROGRESS OF THE SUGAR BETTER THE PR	RIMENTS DES OF D TO BE A ES. TO E EXPERIMENTS WERE LDS FROM THE 1, 8 AND 20 EET & CARROT HARVEST.
THIS IS A PROGRESS REPORT ON AEROJET'S STUDIES OF EXPERIENTLY UNDERWAY (E.G. PLANT GROWTH & DIMP IN TWO MOST APPLICATION TO SOIL ARE CONTINUING. EVAPORATION SEEMES SIGNIFICANT FACTOR IN THE LOSS OF DCPD FROM SOIL SAMPLE DETERMINE THAT THIS IS TRUE EVAPORATION, SEVERAL SIMPLE PERFORMED. THE STATISTICAL TREATMENT OF THE PLANT YIE PPM DIMP GROWTH TESTS AWAITS COMPLETION OF THE SUGAR BETTER THE PROGRESS OF THE SUGAR BETTER THE PR	RIMENTS DES OF D TO BE A ES. TO E EXPERIMENTS WERE LDS FROM THE 1, 8 AND 20 EET & CARROT HARVEST. 19950118 030 15. NUMBER OF PAGES 16. PRICE CODE

Standard Form 298 (Rev. 2-89) Prescribed by ANSI Std. 239-18

17. SECURITY CLASSIFICATION UNCLASSIFICATION

AEROJET ORDNANCE AND MANUFACTURING COMPANY 9236 East Hall Road Downey, California 90241

DETERMINATION OF DECONTAMINATION CRITERIA

DIMP AND DCPD (U)

Report No. 1953-01(16)MP

Contract DAMD-17-75-C-5069

Τo

U.S. ARMY, Ft. Detrick Fredrick, Maryland 21701

Accesio	n For	
NTIS DTIC Unanno Justific	TAB ounced	Ż
By_ Distrib	ution /	
Α	vailabilit	y Code s
Dist	Avail a Spe	and / or cial
A-1		

Prepared by:	P.a. O'Donovan	Date:	8 Decembe	er 1976
4	P. A. O'Donovan		·	
		No. of	Pages:	16

NC110101010		į	ŀ	Ì	Ì	l	l		ŀ	ļ			Ì				_				
CESCALLION	7-	٧ ٧	υD	04	Zν	ی ۵				Σ.	12	72						ᇿ윘	¥12	¥22	U J 23 24
SURVEY OF LITERATURE									ļ.—		ļ						ļ	ļ			
PROTOCOL TASK II				•																	
HYDROPONIC EXPERIMENTS											,			-							
SELECT PLANTS	٠.																				
INSTALL APPARATUS		-																			
GERMINATE SEEDS			1					<u>.</u>								.					
GROW AND INOCULATE PLANTS				Ī	1	-	-	-	-	_		_	<u></u>								
PHOTOGRAPHIC AND CHEMICAL ANALYSIS			Î	Î	Ī	Ì	+	\dashv	-	-								<u> </u>			
OCOL TASK III (PART 1)	L						-	-	-	_	L			-	\vdash		ļ. <u>.</u>	<u> </u>			
SOIL CULTURE EXPERIMENTS								-							·						
CONSTRUCT GREENHOUSE									-	_											
PREPARE TEST PLAN									[- T				_							
GROW AND INOCULATE PLANTS	_	_								_1	_		1	ij	-			•			
PRODUCE CARROT AND SUGAR BEET \$															1	H	-	_	-1		
PHOTOGRAPHIC AND CHEMICAL ANALYSIS											┛		-	7	1						
RADIOACTIVE DCPD TRACING															_1	>}	-	4	_		
LYSIMETER STUDIES	_						 							 	-	-		ļ.	_		Γ
PROCURE, PROCESS AND FABRICATE LYSIMETERS			1	Î	Ī	1		_													
IRRIGATE AND ANALYZE LYSIMETER CONTENTS																-					
CHRONIC DIMP						Ī	1	┪	┨	4				Ì	1	7					
SINGLE CHARGE DIMP							-			4	1		1	7	┪	-	-	-	4	1	
DEVELOP ANALYSIS FOR DCPD IN SOIL	_									_						-	_				
DATA							_								_		-				·
ANNUAL REPORT														7							
	SURVEY OF LITERATURE MOTOCOL TASK II HYDROPONIC EXPERIMENTS SELECT PLANTS INSTALL APPARATUS GENMINATE SEEDS GROW AND INOCULATE PLANTS PHOTOGRAPHIC AND CHEMICAL ANALYSIS PHOTOGRAPHIC AND CHEMICAL ANALYSIS REPARE TEST PLAN GROW AND INOCULATE PLANTS PRODUCE CARROT AND SUGAR BEET S PHOTOGRAPHIC AND CHEMICAL ANALYSIS RADIOACTIVE DCPD TRACING LYSIMETER STUDIES PHOCURE, PROCESS AND FABRICATE LYSIMETERS IRRIGATE AND ANALYZE LYSIMETER CONTENTS CHRONIC DIMP SINGLE CHARGE DIMP DEVELOP ANALYSIS FOR DCPD IN SOIL DATA	RUEY OF LITERATURE DOOL TASK II INSTALL APPARATUS GERMINATE SEEDS GROW AND INOCULATE PLANTS PHOTOGRAPHIC AND CHEMICAL ANALYSIS DOOL TASK III (PART 1) IL CULTURE EXPERIMENTS CONSTRUCT GREENHOUSE PREDARE TEST PLANT GROW AND INOCULATE PLANTS PRODUCE CARROT AND SUGAR BEET S PROTOGRAPHIC AND CHEMICAL ANALYSIS RADIOACTIVE DOOP TRACING SIMETER STUDIES PROCURE, PROCESS AND FABRICATE LYSIMETERS IRRIGATE AND ANALYSIS FOR DOOP IN SOIL TA NUAL REPORT	FER IMENTS INTS PARATUS SEEDS INOCULATE PLANTS PHIC AND CHEMICAL ANALYSIS PHIC AND CHEMICAL ANALYSIS CERECHHOUSE ST PLAN INOCULATE PLANTS CE CARROT AND SUGAR BEET S PHIC AND CHEMICAL ANALYSIS VE DCPD TRACING NIES ROCESS AND FABRICATE LYSIMETERS ND ANALYSIS FOR DCPD IN SOIL OF ANALYSIS FOR DCPD IN SOIL	RATURE FERIMENTS INTS PARATUS SEEDS INOCULATE PLANTS PHIC AND CHEMICAL ANALYSIS FOR ENHOUSE ST PLAN INOCULATE PLANTS ST PLAN INOCULATE PLANTS WE CARROT AND SUGAR BEET S PHIC AND CHEMICAL ANALYSIS WE COPD TRACING NIES ROCESS AND FABRICATE LYSIMETERS ND ANALYSIS FOR DCPD IN SOIL	RATURE FERIMENTS INTS PARATUS SEEDS INOCULATE PLANTS PHIC AND CHEMICAL ANALYSIS FOR ECHHOUSE ST PLAN INOCULATE PLANTS FOR ECHANTS FOR ECHA	FERIMENTS INTS PARATUS SEEDS INOCULATE PLANTS PHIC AND CHEMICAL ANALYSIS PHIC AND CHEMICAL ANALYSIS PERENHOUSE ST PLAN INOCULATE PLANTS CERECHHOUSE ST PLAN INOCULATE PLANTS FOR CAROT AND SUGAR BEETS PHIC AND CHEMICAL ANALYSIS VEDCED TRACING SIES ROCESS AND FABRICATE LYSIMETERS NO ANALYSIS FOR DCPO IN SOIL OF ANALYSIS FOR DCPO IN SOIL	FERIMENTS INTS PARATUS SEEDS INOCULATE PLANTS PHIC AND CHEMICAL ANALYSIS PERENHOUSE ST PLAN INOCULATE PLANTS CERECHHOUSE ST PLAN INOCULATE PLANTS FOR CARROT AND SUGAR BEET S PHIC AND CHEMICAL ANALYSIS WE DOED TRACING NIES ROCESS AND FABRICATE LYSIMETERS NO ANALYSIS FOR DOED IN SOIL OF ANALYSIS FOR DOED IN SOIL	FRIMENTS FRATURE FERIMENTS FARATUS SEEDS INOCULATE PLANTS PHIC AND CHEMICAL ANALYSIS FOR ECHHOUSE ST PLAN INOCULATE PLANTS FOR ECHANTS FOR	FRIMENTS FARATUS SEEDS INOCULATE PLANTS PHIC AND CHEMICAL ANALYSIS FOR ECHHOUSE ST PLAN INOCULATE PLANTS FOR CARROT AND SUGAR BEETS PHIC AND CHEMICAL ANALYSIS FOR CARROT AND SUGAR BEETS F	FRIMENTS FRATURE FRIMENTS FARATUS SEEDS INOCULATE PLANTS PHIC AND CHEMICAL ANALYSIS FOR ECHHOUSE ST PLAN INOCULATE PLANTS FOR ECHANCAL ELYSIMETERS IND ANALYSIS FOR DOPD IN SOIL FOR PANALYSIS FOR DOPD IN SOIL	RATURE FERIMENTS INTS PARATUS SEEDS INOCULATE PLANTS PHEC AND CHEMICAL ANALYSIS FOR ECHHOUSE ST PLAN INOCULATE PLANTS CERECHHOUSE ST PLAN INOCULATE PLANTS FOR ECHHOUSE ST PLAN FOR ECHHOUSE FOR	FER IMENTS NATURE FER IMENTS NATA NATA NATA PARATUS SEE DS INOCULATE PLANTS PHIC AND CHEMICAL ANALYSIS PER ENHOUSE ST PLAN INOCULATE PLANTS CER ENHOUSE ST PLAN INOCULATE PLANTS NO CASS AND FABRICATE LYSIMETERS NO ANALYSIS FOR DCPD IN SOIL OF ANALYSIS FOR DCPD IN SOIL	RATURE RATURE FERIMENTS FOR IMENTS FOR ECHALOLATE PLANTS FOR ECHALOLATE	RATURE RATURE FERIMENTS FOR MENTS FOR ME	RATURE FERIMENTS FARATUS SEEDS INOCULATE PLANTS INOCULATE PLANTS STATUS STATUS	RATURE RATURE FERIMENTS FRIMENTS FRIMENTS	RATURE FERIMENTS FOREINHOUSE STATUS FOREINHOUSE FOREINHOUSE STATUS FOREINHOUSE FO	RATURE FERIMENTS FARATUS SEEDS INCOLUATE PLANTS FOREIMENTS F	RATURE RATURE HTS HTS HTS HTS HTS HTS HTS HT	RATURE RATURE RATURE WITS WATS WATS	RATURE RATURE FERIMENTS MITS MIT

*Possible slippage point. Adjustment of contaminant at this point shifts all following plant work to the right,

▼ - Satisfactory Progress-On Schedule

- Slippage of schedule - a. Reduction of level of effort caused postponement.

Determination of Decontamination Criteria -- DIMP and DCPD Research Task Schedule

Progress on items proposed for action during November 1976 is discussed in the following paragraphs.

FULL SCALE LYSIMETER TESTS

Lysimeter tests designed to study the mobility of water solutions of DIMP (disopropyl methyl phosphonate) in two modes of application to soil are continuing. The soil under investigation consists of five types including:

Chino	. •	sandy clay loam
Brawley	~	silty clay
Ventura	. .	clay loam
Fullerton	₩ .	sandy loam
Walnut		clay loam

Each of the soil types is loaded into its respective lysimeter which consists of a five-foot deep steel cylinder, epoxy coated on the inside, fitted with an array of porous ceramic tensiometer samplers which are embedded in the soil at regular intervals. These samplers allow liquid percolating down through the soil bed to be sampled by applying a light vacuum to the tensiometer tubing.

There are two lysimeters prepared for each type of soil. In one group (Group 1) the soil is irrigated every two weeks with two inches (12, 887 ml) of distilled water containing 20 ppm (parts per million) DIMP. In the other group (Group 2) the top one foot depth of soil was intimately mixed with enough DIMP to result in a soil concentration of 20 ppm.

In addition to the tensiometer water samples the soil is sampled in sixinch depth increments for the full depth of the lysimeter. These samples are also analyzed for DIMP content. Recent tensiometer and soil analytical results are shown in Tables 1 and 2 and Tables 3 and 4, respectively.

The tensiometer water samples are consistent, in general, with their previous behavior. The Group I samples show DIMP distributed throughout all of the soil area. The DIMP contents of the 60-inch drain samples from Group I appear to be equilibrating around the 20 ppm area. Figures 1(a), 1(b), 1(c), 1(d) and 1(e) reflect the current data for these samples.

The Group 2 soil samples are following the established trend quite regularly. No DIMP was detectable in any samples shallower than 18 inches below the surface. All samples except Brawley were showing DIMP in the lowest level (54"-60") and the Fullerton sample showed significant amounts in the lowest layer (14.8 ppm).

The Group 2 water samples at 217 days appear to be generally consistent with previous assays. The Fullerton lysimeter has had DIMP appearing in the 60-inch sample for the last three weekly analyses. This is the first significant showing of any DIMP in a Group 2 drain.

Drainage ratio, the volume of liquid drained out of the lysimeter at the 60-inch level divided by the volume of liquid poured in at the top, is a measure of the amount of water which did not evaporate during the 14-day

Table 1

DIMP Content of Tensiometer Water Samples (Group 1 East)

Depth	Ventura	Chino	Fullerton	Walnut	Brawley
		ppm @ 33	5 days		
611	*	17.7	17.6	13.2	24.4
18"	5.3	11.6	10.5	13.4	21.5
30''	7.5	14.3	11.6	8.4	17.4
42''	8.4	17.4	10.1	7.7	13.4
54''	8.2	17.9	7.8	8.2	11.4
60"	19.9	20.2	17.7	23.9	21.4

^{*} No sample

Table 2

DIMP Content of Tensiometer Water Samples (Group 2 West)

Depth	Ventura	Chino	Fullerton	Walnut	Brawley
		ppm @ 189	days		
6''	*	*	*	*	*
1811	0.7	46.5	9.5	*	9.3
30"	80.9	74.1	37.5	43.7	68.1
42"	水水	47.4	39.4	**	4.5
54''	0.7	*	**	*	*
60"	*	*	29.5	0.7	*

^{* &}lt;0.1 ppm

^{**} No sample

Table 3

DIMP Content of Soil Samples (ppm) Group 1 East (328 days)

			T		
Depth	Ventura	Chino	Fullerton	Walnut	Brawley
0 (surface)*	41.1	56.2	37.7	20.7	17.5
0 - 6"	9.3	14.0	6.7	10.6	14.4
6 - 12"	5.0	4.6	11.0	6.1	12.1
12 - 18"	*	4.9	7.8	5.1	13.3
18 - 2411	*	4.6	14.5	5.4	11.2
24 - 30"	*	3.9	8.7	5.4	12.9
30 - 3611	*	3, 5	9.6	8.0	16.5
36 - 42"	*	2.2	7.2	4.8	10.0
42 - 48"	. ×	3.4	12.6	8.5	5.7
48 - 54"	*	2.4	4.9	7.9	4.0
54 - 60''	*	3.2	7.8	5.0	3.0

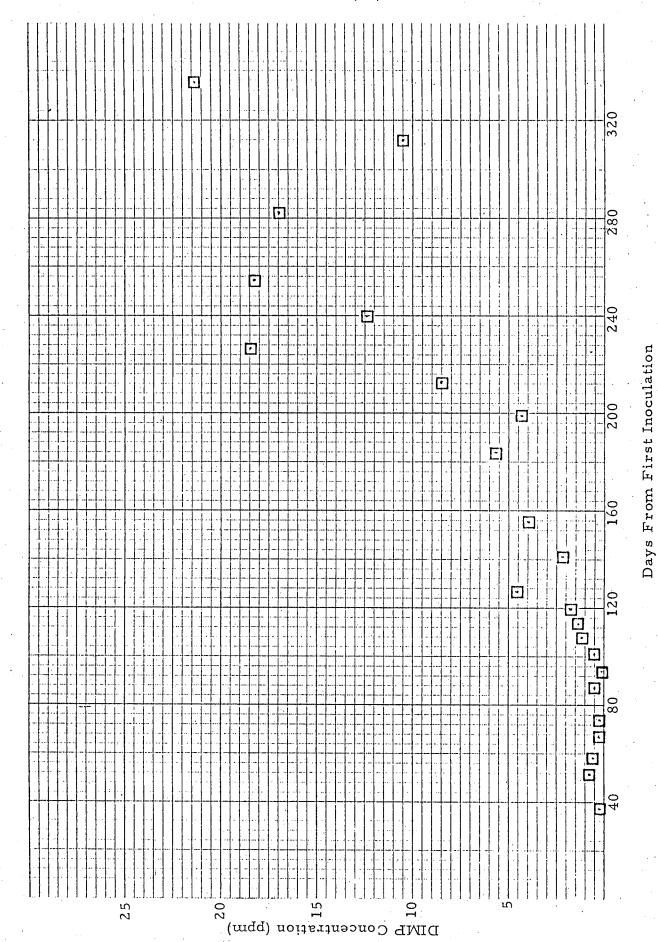
^{* &}lt; 0.1 ppm

Table 4

DIMP Content of Soil Samples (ppm) Group 2 West (188 days)

Depth	Ventura	Chino	Fullerton	Walnut	Brawley
0 (surface) *	*	*	*	χic	*
0 - 6"	*	*	*	*	*
6 - 12"	*	*	*	*	*
12 - 18"	*	*	*	*	*
18 - 24"	1.6	8.6	*	*	*
24 - 30"	14.4	5.6	3.1	*	5.9
30 - 36"	25.1	5.8	12.8	1.1	19.4
36 - 42"	38.7	10.3	10.2	6.0	5.4
42 - 48"	7.1	9.7	9.9	25.3	2.6
48 - 54"	4.2	3.8	9.9	10.5	0.8
54 - 6011	3.7	1.5	14.8	2.4	*

^{* &}lt;0.1 ppm



Concentration of DIMP in 60 Inch Sample of Water Brawley Lysimeter Figure 1(a).

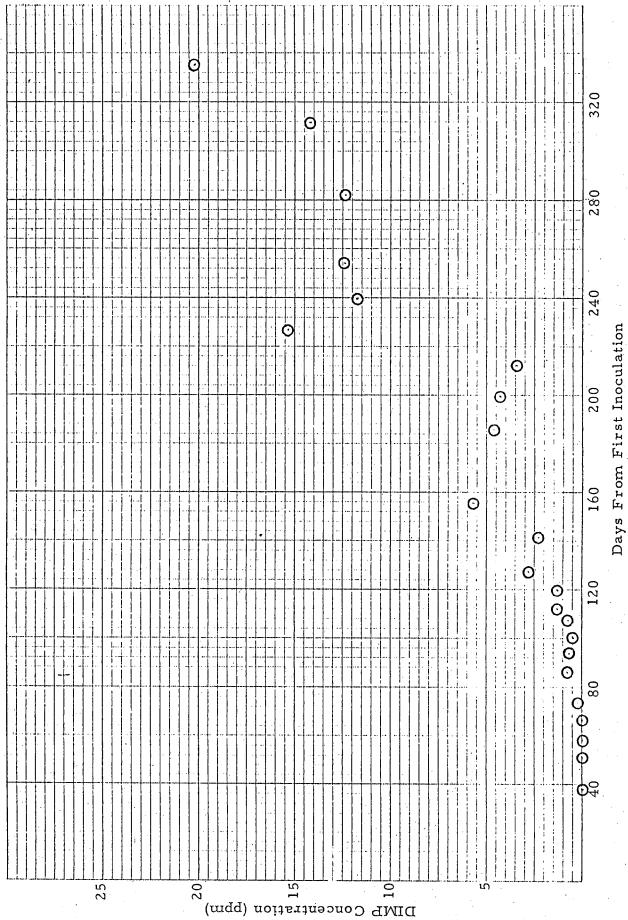


Figure 1(b). Concentration of DIMP in 60 Inch Sample of Water

Chino Lysimeter

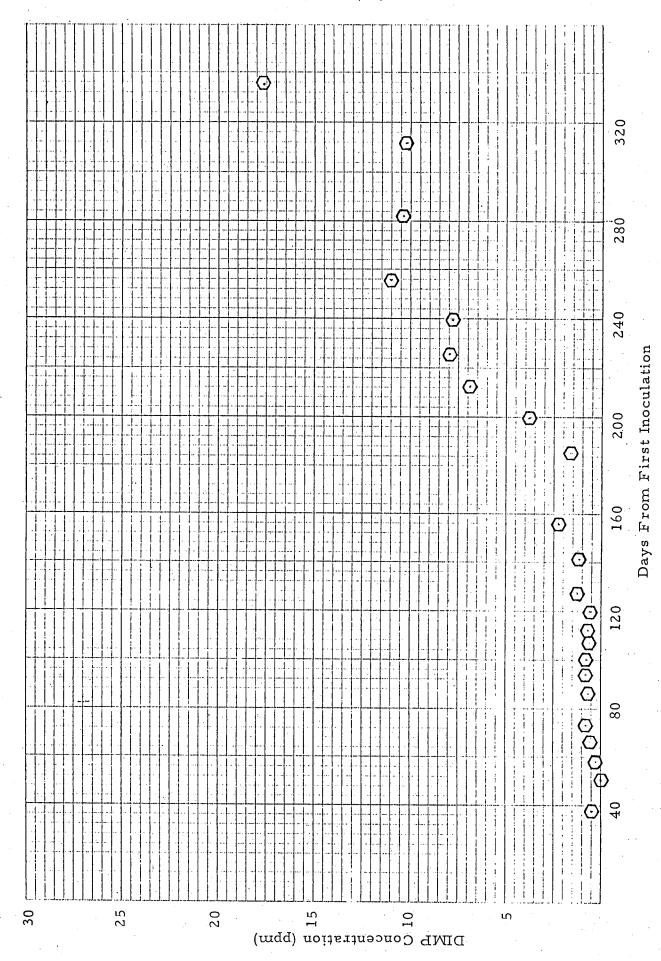


Figure 1(c). Concentration of DIMP in 60 Inch Sample of Water Fullerton Lysimeter

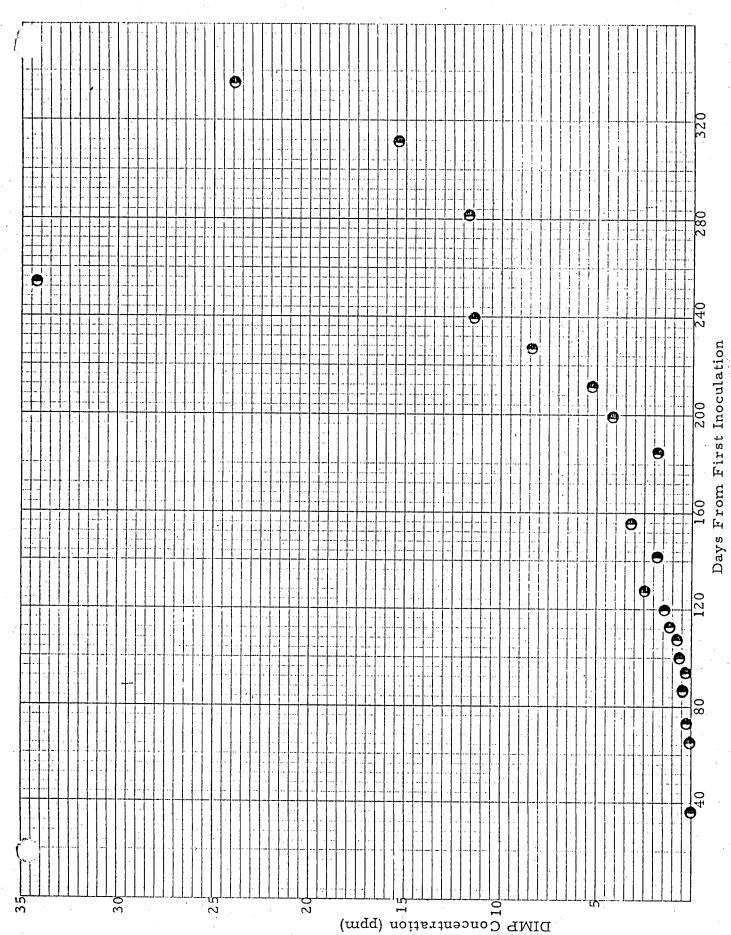
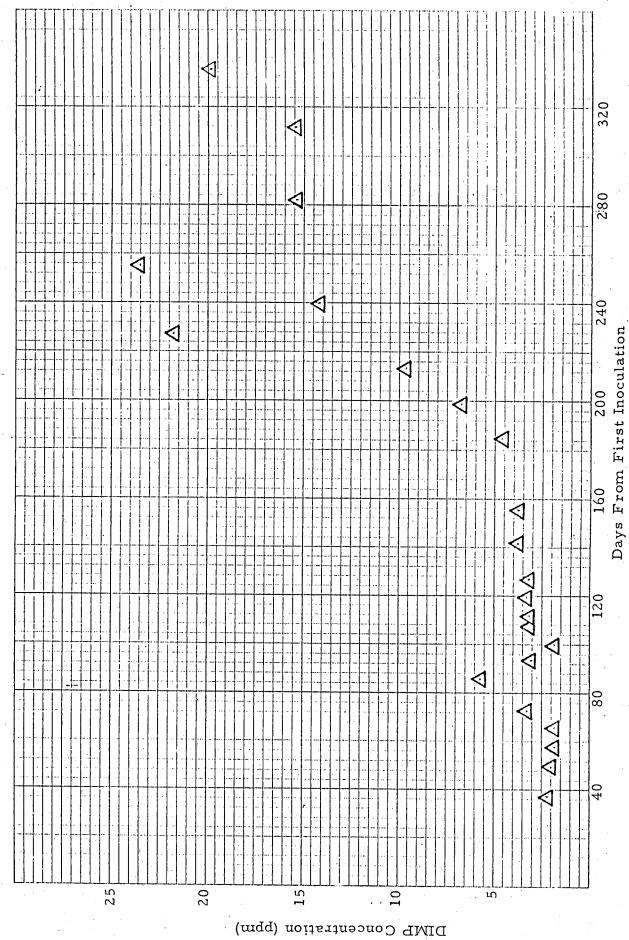


Figure 1(d). Concentration of DIMP in 60 Inch Sample of Water Walnut Lysimeter

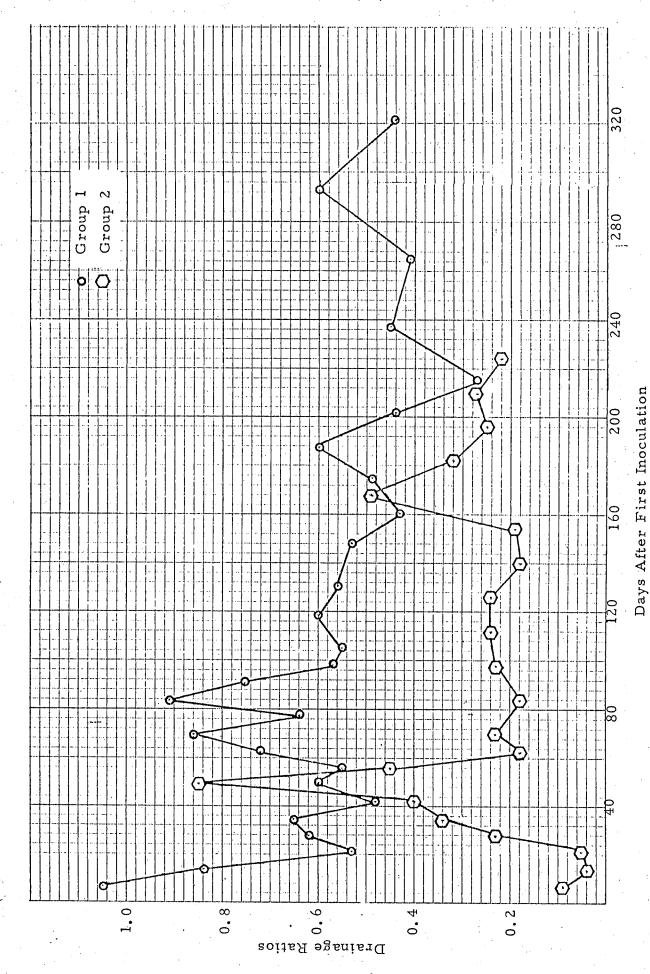


Concentration of DIMP in 60 Inch Sample of Water Ventura Lysimeter Figure 1(e).

lysimeter irrigation period. Figure 2 is a plot of the average drainage ratios for Group 1 and Group 2. In order to determine if the evaporations implied by the drainage ratios were in the realm of credibility an evaporation test was run during this reporting period. In this test a 2-inch layer of distilled water was placed on the surface of the unused by saturated lysimeter adjoining the test units. This water completely evaporated to return the system to the starting condition in 210 hours. This is equivalent to 8-3/4 days, well within the 14 days available for sample evaporation in the test cases. This data is compatible with two similar tests run in recent months.

DCPD ANALYSIS IN SOILS

As discussed in last month's report (1953-01(15)MP) evaporation seemed to be a significant factor in the loss of DCPD (dicyclopentadiene) from soil samples. To determine that this is true evaporation and not a chemical phenomenon such as oxidation, polymerization, etc., several simple experiments were performed. In one such test 186.2 mg DCPD were placed on an uncovered pyrex watchglass and left standing at 24°C on the laboratory bench. The mass of DCPD remaining on the watchglass at various times was determined. This data is shown in Table 5. A plot of the amount of chemical present versus time is shown in Figure 3. This indicates that at these conditions in approximately two hours all of the DCPD had evaporated.

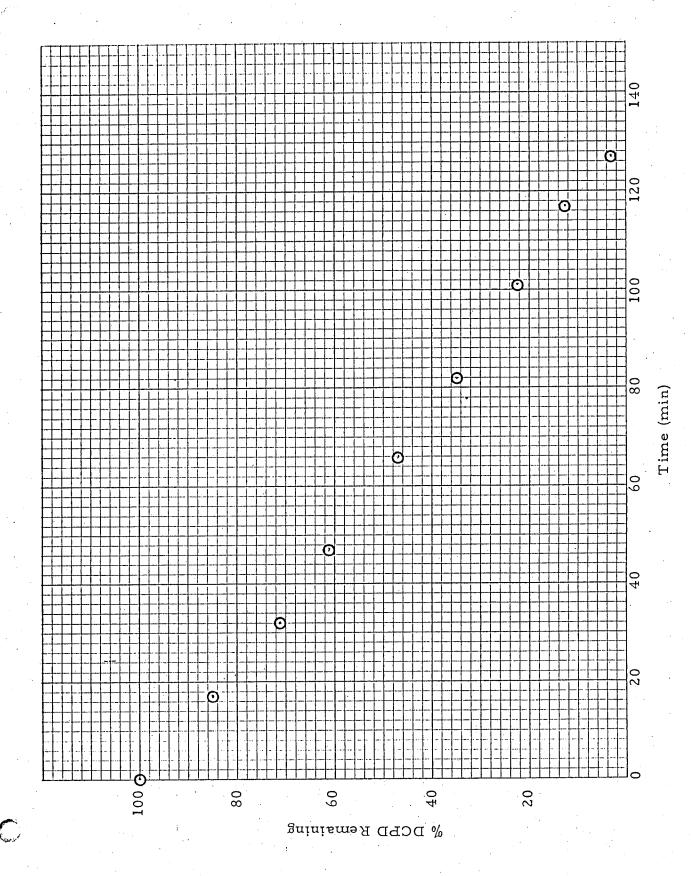


Drainage Ratios of Various Soils in Full Scale Lysimeters Average of All Samples Within the Groups Figure 2.

TABLE 5.

Evaporation of DCPD at 24 °C

Time (min)	Wt of DCPD Remaining (mg)	% DCPD Remaining
0	186.2	100.0
17	158.3	85.0
32	133.3	71.5
47	113.7	61.1
66	87.7	47.1
82	65.5	35.2
101	41.3	22.2
117	23.0	12.4
127	5.1	2.7



igure 3. Evaporation of DCPD From Watchglass at 24°C

1953-01(16)MP

In an attempt to have greater than normal precautions against evaporative loss of the DCPD from standard soil samples, the following procedure was used. The dry soil sample, 256 grams of Fullerton top soil, was weighed into a tumbler jar. 94.4 milligrams of DCPD sealed into a glass ampoule (Jesse Petty Glass Specialties, Tallahassee, Florida 32303) was placed inside the jar, the jar sealed and the ampoule broken by agitation followed by tumbling of the jar for one hour to mix the contents. The entire contents of the jar were then extracted with 128 milliliters of hexane. The yield of DCPD obtained in hexane was 53,3% of the added amount.

The possibility was considered that the soil in some way catalyzed or reacted with the DCPD resulting in decomposition of the chemical. To provide a substrate with different, less reactive, characteristics than soil, the previous experiment was repeated substituting glass "micro beads" for the soil (Superbrite Glass Beads, 3M Company, St. Paul, Minnesota). 150 micrograms were recovered per gram of glass beads from an added DCPD quantity of 369 micrograms for a recovery efficiency of 46.9%. This is comparable to the 53.5% from the Fullerton soil.

A similar mix of DCPD with glass beads was handled in the laboratory for an estimated hour's time while weighing small samples from it. The bulk of this material was subsequently extracted with hexane and this analyzed. The yield of DCPD from this operation was 19.2%. The inference from this analytical data and previous data and observations is that the evaporation of DCPD is significant. A more elaborate analytical procedure would be required for the DCPD to make certain that no evaporative losses occurred in the laboratory. Since the bulk samples to be analyzed (lysimeter soil, irrigation water, etc.) are not protected against evaporation the relative value of such precise analyses remains to be determined. Further investigations of these analyses will not be made at this time.

SOIL CULTURE EXPERIMENTS

The statistical treatment of the plant yields from the 1, 8 and 20 ppm DIMP growth tests awaits completion of the sugar beet and carrot harvest. The range finding tests are also continuing in soil. As of the last report the apparent effective dose for DIMP is still holding at 50 ppm which shows minimal phytotoxicity symptoms at that level.

PROPOSED ACTIVITY FOR DECEMBER 1976

- Harvest carrots and sugar beets from the 1, 8, and 20 ppm
 phytotoxicity test areas. Subject yield data to statistical analysis.
- Chemically analyze pot soil and plant material from above areas.
- Continue treatment and analysis of lysimeter soil and water samples.
- Continue the gross range finding effectiveness level experiments for DIMP and DCPD in soils.
- Finalize equipment set-up for radioactive DCPD evaporation/ decomposition experiments.